

APPLICATION FOR LETTERS PATENT
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

FOR:
REVERSIBLE CANTED SAW BLADE

By:
Thomas Wheeler
Nicholas Achterberg
Thomas Gaffney

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REVERSIBLE CANTED SAW BLADE

FIELD OF THE INVENTION

[0001] The present invention relates generally to saw blades, and more particularly to a saw blade having an integrated cant angle.

BACKGROUND

[0002] A reciprocating saw blade may include features that provide increased cutting speed. For example, hook angle, kerf, teeth per inch and cant-angle may be adjusted to allow faster cutting time. The first three features allow a certain variation without incurring additional manufacturing costs. However, to include a non-zero cant angle, additional processing steps or process types must be used.

[0003] For example, a first conventional design includes a canted blade including a toothed edge tapering toward the shank end. Such a design provides a blade having a reduced cross sectional area near the shank end resulting in reduced blade strength. In addition, higher cant angles are not easily achieved due to the length of the blade.

[0004] A second conventional design includes a canted blade including a shank extending at a predetermined angle toward the toothed edge. This design must allow for increased material width to accommodate the shank. Such an arrangement can require 10-15% wider material strip which drives up cost.

[0005] It is therefore desirable to provide a positive canted blade while maintaining methods and raw-material strip-widths that apply to zero-canted blades.

SUMMARY OF THE INVENTION

[0006] It is a general object of the present invention to provide a positive canted saw blade while maintaining manufacturing methods and raw-material strip-widths that apply to zero-canted blades.

[0007] In one form, the present invention provides a saw blade including a cutting portion having a toothed edge and an opposite edge. The toothed edge defines a cutting plane. A shank portion is attached to and laterally offset from the opposite edge defining a step thereat. The shank includes an end portion including a mounting edge, the mounting edge and step define a mounting plane which is angularly offset from the cutting plane.

[0008] In another form, the present invention provides a support structure including a pair of lateral walls and a base portion extending between the pair of lateral walls. A saw blade includes a cutting portion having a toothed edge and an opposite edge. The toothed edge defines a cutting plane. A shank is attached to and laterally offset from the opposite edge defining a step thereat. The shank includes an end portion having a mounting edge. The mounting edge and the step define a mounting plane which is angularly offset from the cutting plane. The saw blade is insertable between the pair of lateral walls whereby the mounting plane abuts one of the lateral walls.

[0009] In yet another form, the present invention provides a saw blade having a cutting portion including a toothed edge defining a first plane and an opposite edge defining a second plane, the second plane substantially parallel to the first plane. The saw blade further includes a shank portion having a first edge substantially coplanar to the first plane and a second edge defining a third plane, the third plane angularly offset from the second plane.

[0010] Further areas of applicability of the present invention will become apparent from the detailed description provided hereinafter. It should be understood however that the detailed description and specific examples, while indicating preferred embodiments of the invention, are intended for purposes of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The present invention will become more fully understood from the detailed description and the accompanying drawings, wherein:

[0012] Figure 1 is an environmental view of the saw blade retaining mechanism shown in a jig saw.

[0013] Figure 2 is a perspective view of the saw blade retaining mechanism.

[0014] Figure 3 is an exploded perspective view of the saw blade retaining mechanism.

[0015] Figure 4 is a plan view of the saw blade retaining mechanism.

[0016] Figure 5 is a side view of the saw blade retaining mechanism taken along line 5-5 of Figure 4 shown operatively retaining a first or second saw blade having different thicknesses.

[0017] Figure 6 is a plan view of the saw blade retaining mechanism shown with the clamp system removed and a non canted blade positioned therein.

[0018] Figure 7 is a plan view of the saw blade retaining mechanism shown with the clamp system removed and a canted blade positioned therein.

[0019] Figure 8 is a plan view of the canted saw blade.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0020] With initial reference to the perspective view of Figure 1, a retaining mechanism or clamp device 20 according to the teachings of the present invention is illustrated within a housing 11. The housing 11 includes push button 8 which is operable to disengage the clamp device 20. The clamp device 20 is shown operatively interconnected to a conventional jig saw 10 and is configured to securely retain a plurality of saw blades having a variety of thicknesses. For example, as shown in Figure 5, the clamp device 20 is configured to securely retain a first or second blade 12, 12' with different thicknesses.

[0021] For exemplary purposes, blades 12 and 12' are provided in the illustrations. Blade 12 has a thickness A of 0.035 inches (0.89mm) and blade 12' has a thickness A' of 0.05 inches (1.27mm). Blades 12 and 12' generally fit the "thin" and "thick" blade categories respectively.

[0022] With continued reference to Figure 1, and additional reference to Figures 2 and 3 wherein the housing 11 and push button 8 have been removed for illustrative purposes, the retaining mechanism 20 generally includes a cam system 14 and base 16. The cam system 14 includes a rocker arm 18 having a lever end 26, an intermediate pivot portion 22 and a clamp end 24. The intermediate pivot portion 22 is adapted to receive a support shaft 30 therethrough for rotational movement thereabout. The lever end 26 is activated by the push button 8 mounted on the housing 11, shown in Figure 1.

[0023] Rocker arm 18 is biased in a clockwise direction (arrow C) such that the clamp end 24 is influenced against the saw blade 12. Spring 32 includes a first and second end 34, 36 fixedly attached to a first and second side wall 40, 42 of base 16. An intermediate loop 44 of the spring 32 is adapted to communicate with an upper surface 46 of the rocker arm 18 to provide a biasing force thereat.

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[0024] With particular reference to Figures 2 and 3, the base 16 includes a floor 50 having first and second side walls 40, 42 extending perpendicularly therefrom defining a channel 52. The first and second side walls 40, 42 include first and second spring mounting passages 54, 56 for fixedly securing the spring ends 34, 36 therethrough. Similarly, support shaft 30 is retained through apertures 64, 66 disposed in walls 40, 42 respectively. The ends of first and second side walls 40, 42 are contoured outwardly creating first and second guide flanges 68, 70. The guides 68, 70 serve to help direct the blade 12 into the channel 52. The floor 50 of the base 16 includes a stop 72. Stop 72 is oriented at an angle toward the cam system 14.

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[0025] Referring now to Figures 2 and 3, the operation of the retaining mechanism 20 will now be described using saw blade 12. To install blade 12 in the retaining mechanism 20, the blade 12 is inserted through channel 52 against the clamp end 24 of cam system 14 until the outer edge 76 of the blade 12 abuts the angled contact surface 78 of stop 72. Tail section 80 of blade 12 extends between stop 72 and the first side wall 40 to provide the blade 12 with additional stability. Side surface 74 of stop 72 provides a bias against surface 58 of tail section 80 of blade 12. Once the blade is fully inserted, spring 32 biases the contoured contact surface 82 of the clamp end 24 against the aperture wall 84 of the blade 12 which influences surface 76 against surface 78 of stop 72 thereby securing

the blade 12 to the retaining mechanism 20. Contoured contact surface 82 of clamp end 24 interfaces aperture wall 84 thus providing a secure edge contact therewith. Accordingly, the contoured contact surface 82 of clamp end 24, the angled contact surface 78 and side surface 74 of stop 72 counter the forces created during cutting or other operations. To remove the blade, the push button 8 is pressed against the lever end 26 of rocker arm 18 to disengage the clamp end 24 from the aperture wall 84 of the blade 12. Saw 10 prevents the user from turning on the unit while push button 8 is depressed. Similarly, push button 8 will not depress while saw 10 is in operation.

[0026] Referencing Figures 2, 4 and 5, the installation of second blade 12' (which has a greater thickness A' than thickness A of the first blade) is the same as described for the first blade 12. The geometry of the angled contact surface 78 of stop 72 and the contoured contact surface 82 of rocker arm 18 is such that blades having different thicknesses may be securely retained. Explained further, blade 12 having a thickness "A" and a mounting aperture 86 a distance "B" from the outer edge 76 of the blade 12 is located securely between the contoured contact surface 82 of the clamp end 24 and the angled stop contact surface 78 at contact points 88, 90 respectively. Likewise, blade 12' having a greater thickness, "A'" and a smaller distance "B'" from the outer edge of the saw may be securely retained in the clamp device 20 but has contact points 92, 94 located a distance higher on the respective clamp and stop contact surfaces 82, 78 respectively. As such, the geometry of the clamp contact surface 82 and the angled stop contact surface 78 cooperate to provide a versatile configuration that allows a variety of blades having a variety of thicknesses to be securely located at various contact points therebetween.

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[0027] Turning now to Figures 6, 7 and 8, the retaining mechanism 20 of the present invention is operable to securely retain blade 12 which incorporates an integrated cant angle "a" (illustrated best in Figure 8), as well as a blade 28 having no cant angle (Figure 6). An important feature of canted blade 12 is that it includes a step 38 incorporated in the shank of the blade as well as an angled tail section 80. The step 38 and angled tail section 80 of the blade shank design allows for a canted blade to be formed using standard manufacturing methods and using raw-material strips having the same widths "W" that apply to blades having no cant angle (as illustrated in Figures 6 and 8). As such, a canted blade can be provided for no additional cost compared to the zero canted blades. Explained further, edges 60, 62 of non-canted blade 28 are separated an equivalent distance (designated "W" on Figure 6) as parallel edges 96, 98 of canted blade 12 (designated "W" on Figure 8). Accordingly, canted blade 12 with step 38 and angled tail section 80 can be stamped from a material strip no wider than used for blade 28. The angled tail section 80 of canted blade 12 includes a side surface 100 which is angled slightly relative to a longitudinal axis offset an angle "a" from the longitudinal axis "x" of the blade 12. Angle "a" is generally between 2 and 6 degrees and preferably 3 degrees. The mounting aperture 86 of the blade 12 is also angularly oriented such that the rear aperture wall 84 is perpendicular to the side surface 100 of the angled tail section 80 so that the aperture wall 84 is oriented perpendicular to the side walls 40, 42. The outer edge 76 at the rear of the blade 12 is also perpendicular to the side surface 100.

[0028] The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit

and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

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